

2018 International Energy Conservation Code (IECC)

Resources
Commissioning
Commercial Mechanical 2018 vs 2009

Bruce Hauschild
bruce.hauschild@nebraska.gov

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Questions

- Please feel free to submit questions in chat throughout the presentation. Questions will be answered during specified breaks during the presentation.
- We can stay on longer than the originally scheduled end time to answer questions.
- An FAQ document will be uploaded to the video events page.

Contact Information and Questions

Bruce Hauschild

Energy Technical Advisor

**Nebraska Department of
Environment and Energy**

**In addition to submitting questions
today via online chat, please feel
free at any time in the future to
submit question to
bruce.hauschild@nebraska.gov**



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The Other Code

ASHRAE 90.1 2016

Visit https://www.techstreet.com/ashrae/ashrae_standards.html or
www.ASHRAE.com and click on the bookstore
for **ASHRAE 90.1 2016**

Either ASHRAE 90.1 2016 or the 2018 IECC may be used for energy code compliance in Nebraska, but you must pick one or the other and then that is used for the entire building - envelope, lighting, mechanical, and hot water.

a free version of 90.1 is not available.

Careful, ASHRAE 90.1 **2019** is out
Be sure to click on **2016** if ordering.

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Free Online Versions of all Codes from the International Codes Council (ICC) are available.

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The 2018 IECC is currently shown

**In the future you may need to
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ICC - International Code Council x +

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Code Council Annual Conference Update

After much discussion and deliberation, the Board has decided not to hold a Code Council Annual Conference, Expo, and Annual Business Meeting in 2020.

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2018 International Building Code
(Fourth Printing: Jan)




2018 International Residential Code
(Third Printing: Sep 2019)



2018 International Fire Code
(Fourth Printing: Dec)



2018 International Energy...
(Fourth Printing: Mar)



2018 International Mechanical Code
(Third Printing: Dec 2019)


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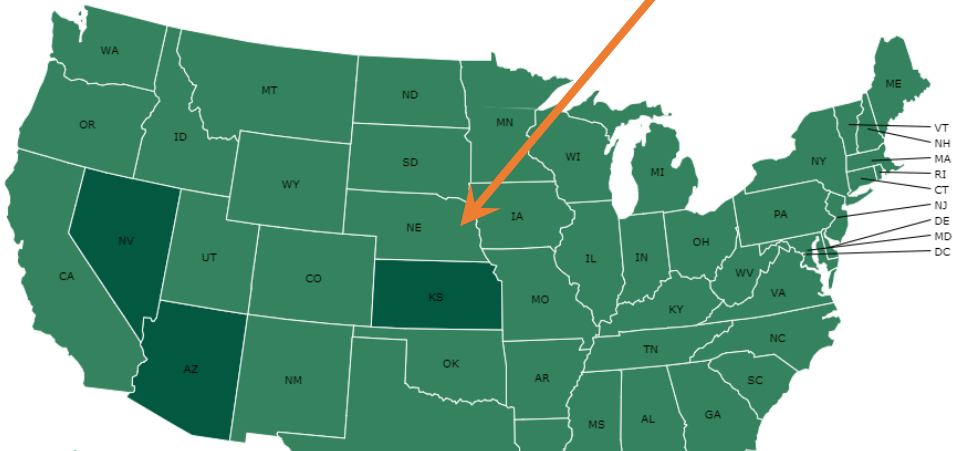


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PREFACE

EFFECTIVE USE OF THE INTERNATIONAL ENERGY CONSERVATION CODE

IECC—COMMERCIAL PROVISIONS

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CHAPTER 2 [CE] DEFINITIONS

CHAPTER 3 [CE] GENERAL REQUIREMENTS

CHAPTER 4 [CE] COMMERCIAL ENERGY EFFICIENCY

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IECC—RESIDENTIAL PROVISIONS

CHAPTER 1 [RE] SCOPE AND

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Legend

The free view provides users with read only access to the code book contents where certain features like copy, paste and print are not available.

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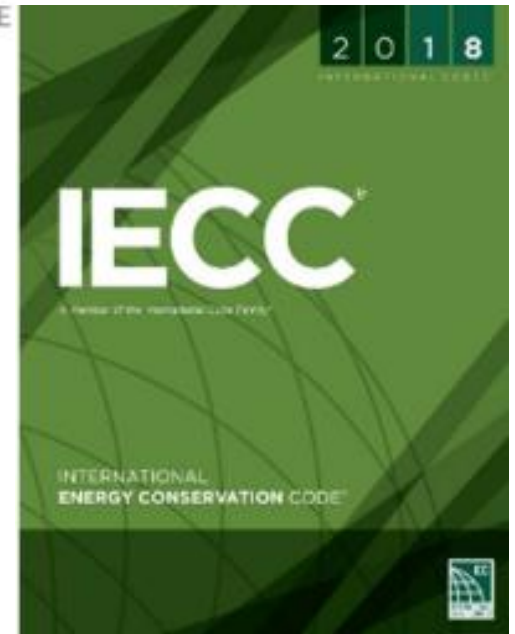
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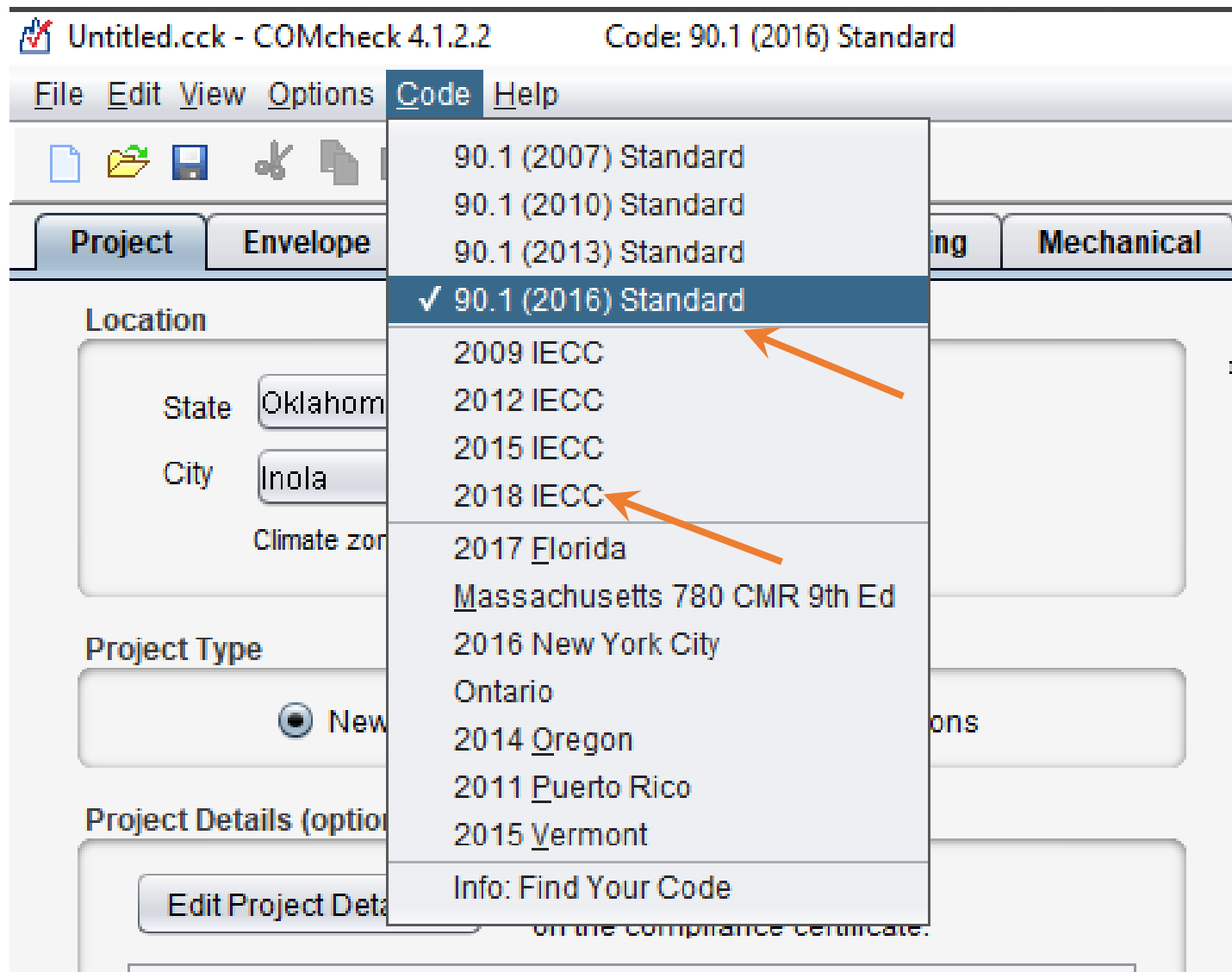
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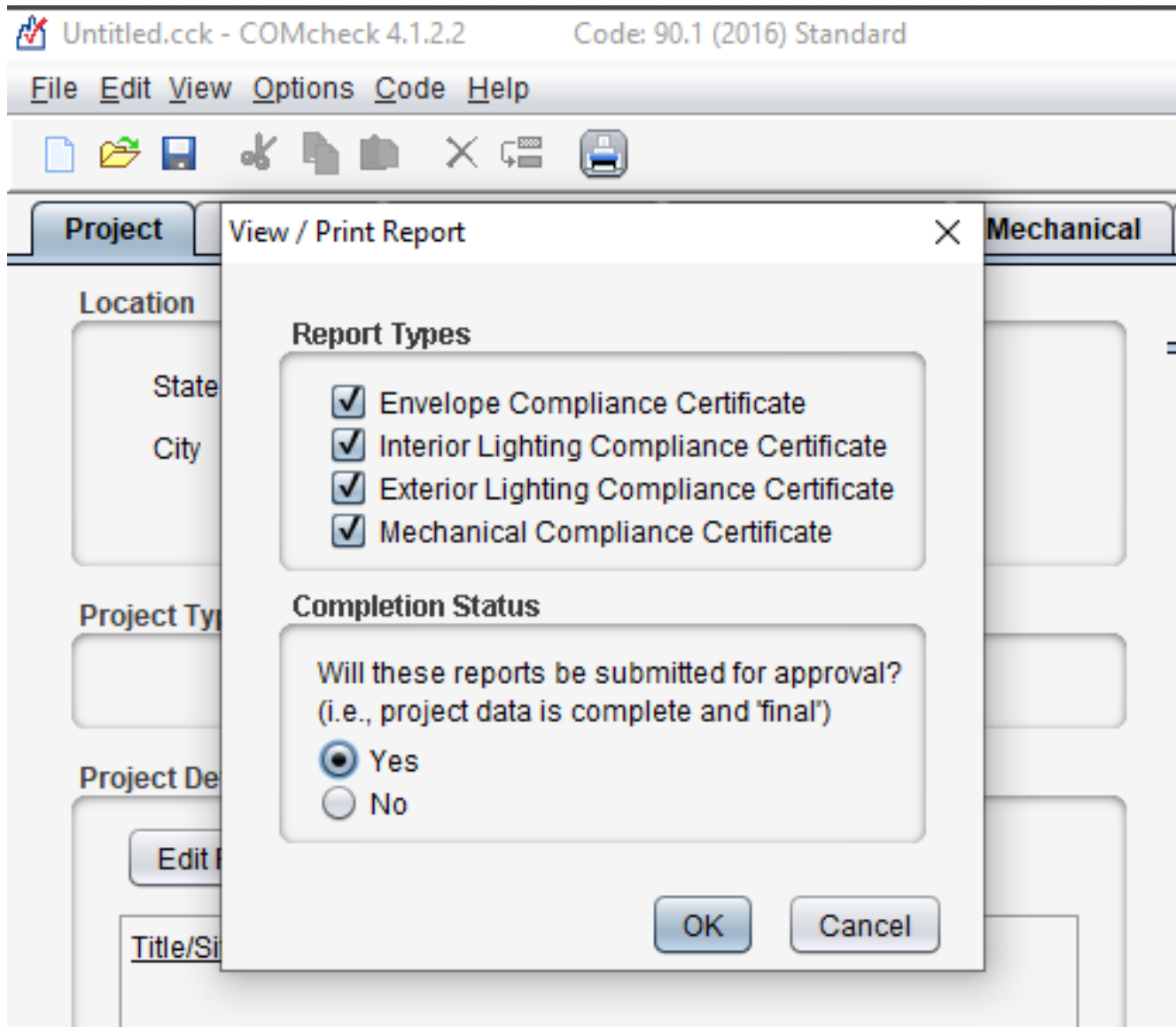
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Check compliance with the
2018 IECC,
and also
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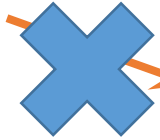


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Updates to REScheck and COMcheck Building Energy Code Compliance Software

The U.S. Department of Energy (DOE) is directed to provide technical assistance to states to support the implementation of model residential and commercial building energy codes (42 USC 6833). As part of this assistance, the DOE Building Energy Codes Program provides ongoing support for REScheck and COMcheck compliance software, which are updated based on new editions of the model codes. DOE has published [guidance](#)  surrounding its support for the software, including technical assistance requests for modified versions.

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Resources

Any Questions?

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Commissioning, Section C408

Exceptions: The following systems are exempt:

Mechanical systems and service water heater systems in buildings where the total mechanical equipment capacity is less than 480,000 Btu/h (40 tons or 140.7 kW) cooling capacity and 600,000 Btu/h (50 tons or 175.8 kW) combined service water-heating and space-heating capacity. (check your sizing)
“or”

Systems included in Section C403.5 that serve individual dwelling units and sleeping units. (thought to be an error as C403.5 is about economizers?-have contacted IECC, no word at this time)



WOOHOO!!!

Commissioning, Section C408

Building operations and maintenance information.

The building operations and maintenance documents shall be provided to the owner and shall consist of:

1. Manufacturers' information, specifications and recommendations;
2. Programming procedures and data points;
3. Narratives; and
4. Other means of illustrating to the owner how the building, equipment and systems are intended to be installed, maintained and operated.



Commissioning, Section C408

Mechanical systems and service water-heating systems commissioning and completion requirements.

Prior to the final mechanical and plumbing inspections, the registered design professional or approved agency shall provide evidence of mechanical systems commissioning and completion in accordance with the provisions of this section.

Label the Equipment.

Required regular maintenance actions for equipment and systems shall be clearly stated on a readily visible label. The label shall include the title of publication number for the operations and maintenance manual for that particular model and type of product.



Commissioning, How are you affected?

Registered Design Professional or Approved Agency.

Have you met, or are you aware of who the commissioning agent will be?

The commissioning agent does NOT have to be a third party, but will be either, by code definition, a “registered design professional,” or an “approved agency” which is an agency approved as acceptable by the code official.

OEM Manuals. How many will the commissioning agent need?

Time. Have I included time on my bid for commissioning, how much?

Balancing. Are you currently ensuring systems are balanced?

Performance tests. Are you currently testing equipment performance?

Controls. Will you be required to ensure controls are properly set?

Economizers. Are economizers set and tested for functionality?



Commissioning Any Questions?

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Mechanical, Section C403

Load Calculations. Same as 2009, ANSI/ASHRAE/ACCA Standard 183 Peak Cooling and Heating Load Calculations in Buildings **Except Low-Rise Residential** Buildings – Trane Trace*, HAP*, and other software. (*not a recommendation)

Remember the Commissioning Exemptions! How about Economizer exemptions?

They are Based on Capacity.

Equipment Sizing. The output capacity of heating and cooling equipment shall be not greater than that of the smallest available equipment size that exceeds the loads calculated.

Mechanical, Section C403

Zone Isolation. HVAC Systems serving zones that are over 25,000 square feet in floor area or that span more than one floor and are designed to operate or be occupied *nonsimultaneously* shall be divided into isolation areas. Each isolation area shall be equipped with isolation devices and controls configured to automatically shut off the supply of conditioned air and outdoor air to and exhaust air from the isolation area. Isolation devices include separate systems, isolation dampers and controls providing shutoff at terminal boxes.



Mechanical, Section C403

Hot gas bypass limitation. Limited to 50% of total capacity for systems with a rated capacity of less than or equal to 240,000 Btu/h, and 25% of total capacity for larger systems.



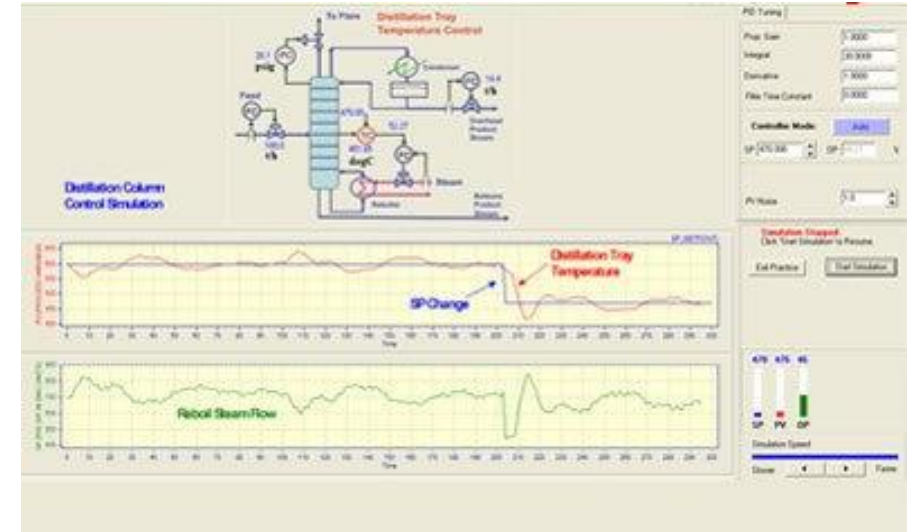
Boiler Turndown.

1 million to 5 million Btu/h must have a minimum 3 to 1 turndown
5 million to 10 million Btu/h must have a minimum 4 to 1 turndown
Over 10 million Btu/h must have a minimum 5 to 1 turndown
Can be met with multiple single input, modulating, or combination.
Controls must lower boiler water temperature based on outdoor temperature.

Vestibule and air curtain heating and cooling. Separate controls. shut the heating system down when the outdoor temp is greater than 45°F. Can't heat over 60°F or cool below 85°.

Mechanical, Section C403

Setback Controls. Now mandatory with a detailed description of automatic setback and start configurations.



Hydronic System Part Load Control. Must meet three control conditions:

1. Automatically reset the supply water temp... some wording changes here
2. Automatically vary fluid flow on combined pump HP of 2 HP or more...
3. Automatically vary pump flow on heating water systems, possibly requiring vfd's. When vfd required, power input shall not be more than 30% wattage at 50% flow. (there are four exceptions to this – 403.4.4 paragraph 4.)

Mechanical (First ½) **Any Questions?**

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Mechanical, – Economizer Exceptions

Economizer Exceptions.

1. Where more than 25 percent of the air designed to be supplied by the system is to spaces that are designed to be humidified above 35°F dewpoint temperature to satisfy process needs.
2. Systems expected to operate less than 20 hours per week.
3. Systems serving supermarket areas with open refrigerated casework.
4. Systems that include a heat recovery system in accordance with Section C403.9.5 (Heat recovery for service water heating – see later slide)



Mechanical, - Economizers

Economizers. An air or water economizer shall be provided for:

1. Chilled water systems with a total cooling capacity, less cooling capacity provided with air economizer, of 1,320,000 Btu/h (110 ton) for Local Water-cooled Chilled-water Systems, or 1,720,000 (143.3 ton) for Air-cooled Chilled-water Systems or District Chilled-Water Systems.

2. Individual fan systems with cooling capacity greater than or equal to 54,000 Btu/h (4.5 ton) in buildings having other than a Group R occupancy. The total supply capacity of all fan cooling units not provided with economizers shall not exceed 20 percent of the total supply capacity of all fan cooling units in the building or 300,000 Btu/h (25 ton), whichever is greater. (300,000 Btu/h up to 1,500,000 Btu/h)



Mechanical, – Economizers

Economizers. An air or water economizer shall be provided for:

3. Individual fan systems with cooling capacity greater than or equal to 270,000 Btu/h (22.5 tons) in buildings having a Group R occupancy. The total supply capacity of all fan cooling units not provided with economizers shall not exceed 20 percent of the total supply capacity of all fan cooling units to the building or 1,500,000 Btu/h (125 tons), which ever is greater. (You're exempted up to 125 tons)

C403.9.5 Heat recovery for service water heating. Condenser heat recovery shall be installed for heating or reheating of service hot water provided that the facility operates 24 hours a day, the total installed heat capacity of water-cooled systems exceeds 6,000,000 Btu/h of heat rejection, and the design service water heating load exceeds 1,000,000 Btu/h... and more)



Mechanical, the rest of the new code...

After the Economizer section of the 2018 code, the 2009 code has been covered. The 2018 code has an additional 14 pages which cover:

1. Integrated economizer control.
2. Economizer heating system impact
3. Air economizers. Where economizers are required, air economizer systems shall be configured to modulate outdoor air and return air dampers to provide up to 100 percent of the design supply air quantity as outdoor air for cooling.
4. Water-side economizers. Where economizers are required, water-side economizers systems shall be configured to cool supply air by indirect evaporation and providing up to 100 percent of the expected system cooling load at outdoor air temperatures of not greater than 55°F dry bulb/45°F wet bulb.

Mechanical, the rest of the new code...

5. Economizer fault detection and diagnostics
6. Requirements for mechanical systems serving multiple zones.
7. Ventilation and exhaust Systems
8. Fans and fan controls
9. Heat rejection equipment
10. Refrigeration equipment performance
11. Construction of HVAC system elements (ducts, pipes, & insulation)
12. Mechanical systems located outside of the building thermal envelope.
13. Service hot water – similar in length to the 2009 IECC, a couple pages, but with some changes.

Section C406, Additional efficiency! WHERE?

Buildings shall comply with one or more of the following:

- | | |
|------------------------------------|--------------------------------------|
| 1. More efficient HVAC performance | 2. Reduced lighting power |
| 3. Enhanced lighting controls | 4. On-site renewable energy |
| 5. Certain Outdoor Air Systems | 6. High efficiency service hot water |
| 7. Enhanced envelope performance | 8. Reduced air infiltration |

“The ventilation system shall be capable of total energy recovery.” C406.6 (#5)

Mechanical Any Questions?

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